

WHAT IS CLAIMED IS:

1. A method for the *in situ* proliferation of a CNS precursor cell located in the tissue lining a CNS ventricle of a mammal, said method comprising administering at least one growth factor to said CNS ventricle to induce the proliferation of said cell.
- 5 2. The method of Claim 1 wherein said at least one growth factor is epidermal growth factor.
3. The method of Claim 2 further comprising administering fibroblast growth factor to said ventricle.
4. The method of Claim 1 wherein said growth factor is administered by an  
10 osmotic pump implanted within said ventricle.
5. The method of Claim 1 wherein said CNS ventricle is the lateral ventricle of the forebrain.
6. The method of Claim 1 wherein said CNS ventricle is the central canal.
7. The method of Claim 1 further comprising administering Bcl-2 to said lateral  
15 ventricle.
8. A method for the *in situ* genetic modification a CNS precursor cell located in tissue lining a CNS ventricle of a mammal, said method comprising administering genetic material to said CNS ventricle to infect said cells, said genetic material being capable of encoding at least one neurological agent.
- 20 9. The method of Claim 8 wherein said CNS ventricle is the lateral ventricle of the forebrain.
10. The method of Claim 8 wherein said CNS ventricle is the central canal.

11. The method of Claim 8 wherein said genetic material is contained within a retroviral construct.
12. The method of Claim 8 further comprising administering at least one growth factor to said ventricle.
- 5 13. The method of Claim 12 wherein said growth factor is epidermal growth factor.
14. The method of Claim 13 further comprising administering fibroblast growth factor to said ventricle.
15. The method of Claim 8 wherein said neurological agent is selected from the  
10 group consisting of growth factors, growth factor receptors, neurotransmitters, neurotransmitter receptors, neuropeptides, growth factor synthesizing enzymes, and neurotransmitter synthesizing enzymes.
16. The method of *in vitro* proliferation of precursor cells comprising the steps of:  
(a) administering at least a first growth factor to a CNS ventricle of a living  
15 mammal, said CNS ventricle being lined by tissue comprising at least one precursor cell;  
(b) removing said tissue from said mammal;  
(c) dissociating said neural tissue to separate said precursor cell from tissue, and  
20 (d) culturing said precursor cell in a culture medium comprising at least a second growth factor and proliferating said cell.
17. The method of Claim 16 wherein said first growth factor is epidermal growth factor.
18. The method of Claim 17 wherein step (a) further comprises administering  
25 fibroblast growth factor to said ventricle.

19. The method of Claim 16 wherein said second growth factor is epidermal growth factor.

20. The method of Claim 19 wherein said culture medium of step (d) further comprises fibroblast growth factor.

5 21. The method of Claim 16 wherein said ventricle is a lateral ventricle of the forebrain of said mammal.

22. The method of Claim 16 wherein said ventricle is the central canal.

10 23. A method of treating a neurological disorder of a mammal comprising administering at least a first growth factor to a ventricle of the central nervous system of said mammal, said ventricle being lined by tissue comprising at least one precursor cell, said growth factor inducing the *in situ* proliferation of said precursor cell to form tissue comprising proliferated precursor cells.

24. The method of Claim 23 wherein said first growth factor is administered by an osmotic pump implanted within said ventricle.

15 25. The method of Claim 23 wherein said neurological disorder affects the brain and said ventricle is located within said brain.

26. The method of Claim 23 wherein said neurological disorder affects the spinal cord and said ventricle is the central canal.

20 27. The method of Claim 23 wherein said first growth factor is epidermal growth factor.

28. The method of Claim 27 further comprising administering fibroblast growth factor to said ventricle.

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29. The method of Claim 23 further comprising the additional steps of: removing said tissue comprising proliferated precursor cells, dissociating said tissue to separate said proliferated precursor cells, culturing said proliferate precursor cells in a culture medium *in vitro* comprising at least a second growth factor to further proliferate said precursor cells, and implanting said proliferated precursor cells into said ventricle of said mammal.

30. The method of Claim 29 wherein said second growth factor is epidermal growth factor.

31. The method of Claim 30 wherein said culture medium further comprises fibroblast growth factor.

32. The method of Claim 23 further comprising the additional steps of: removing said tissue comprising proliferated precursor cells, dissociating said tissue to separate said proliferated precursor cells, culturing said proliferate precursor cells *in vitro* in a culture medium comprising at least a second growth factor to further proliferate said precursor cells, genetically modifying said proliferated precursor cells with genetic material capable of encoding at least one neurological agent, and implanting said genetically modified precursor cells into said ventricle of said mammal.

33. The method of Claim 32 wherein said second growth factor is epidermal growth factor.

34. The method of Claim 33 wherein said culture medium further comprises fibroblast growth factor.

35. A method of treating a neurological disorder of a mammal comprising administering genetic material to a CNS ventricle of a mammal, said ventricle being lined by tissue comprising at least one precursor cell, said precursor cell being genetically modified *in situ* by said genetic material, said genetic material being capable of encoding at least one neurological agent.

36. The method of Claim 35 wherein said genetic material is contained within a retroviral construct.
37. The method of Claim 35 further comprising administering at least one growth factor to said ventricle.
- 5 38. The method of Claim 37 wherein said growth factor is epidermal growth factor.
39. The method of Claim 38 further comprising administering fibroblast growth factor to said ventricle.
- 10 40. The method of Claim 37 wherein said at least one growth factor is administered by an osmotic pump implanted within said ventricle.
41. The method of Claim 35 wherein said neurological agent is selected from the group consisting of growth factors, growth factor receptors, neurotransmitters, neurotransmitter receptors, neuropeptides, growth factor synthesizing enzymes, and neurotransmitter synthesizing enzymes.
- 15 42. The method of Claim 35 wherein said neurological disorder affects the brain and said ventricle is located within said brain.
43. The method of Claim 35 wherein said neurological disorder affects the spinal cord and said ventricle is the central canal.